Iowa Department of Natural Resources
Environmental Protection Commission

ITEM **5** **DECISION**

TOPIC **Contract – United States Geological Survey – Water Level Measurements, Big Rivers Monitoring, Stream Gaging, Surface Flow Estimation and SPARROW Model**

The Department requests Commission approval of a $500,000 contract with the United States Geological Survey to collect water level measurements, collect stream gaging measurements, collect surface water quality data on Iowa's big rivers, and to continue projects to estimate stream discharge measurements and model stream water quality using the SPARROW model.

The purpose of this Agreement is:
Ground-water Levels and Water-Quality Assessment will be the measurement of ground-water levels in a network that has yet to be determined from available public wells that meet the network well search criteria established by the IDNR/USGS team (expected by October 1); IDNR is currently searching the state-wide database using established criteria. The program should also include a written plan to provide an assessment of ground-water levels based upon the past and future data collection. Ground-water quality will also be assessed though the public water supply well network; capitalizing on the existing data from water samples of raw water at the public water supplies. The product of the program is a revised network of wells that will include an ongoing analysis of the state's ground-water supply and water quality by major aquifer type.

Surface-water Quality Assessment or the "Big Rivers" project collects water quality measurements on 10 major tributaries from Iowa. This program will also include assessments to review existing sites and recommendations will be made on modifying the program to provide better alignment with the IDNR existing ambient monitoring network. The data assessment and interpretation will be developed to provide and ongoing analysis of the information in collaboration with the IDNR ambient program. Future direction of the program will include the continued development of the ability to provide the water-quality index for any stream point in Iowa. Part of the new design will be for estimating load fluxes for both actual temporal and spatial loading as well as a monitoring network that would meet the SPARROW modeling.

Surface-water Flow Network is funding from IDNR for stream gages; IDNR will establish the priority for funding by gage from IDNR stakeholders, there will be several tiers of priority based upon the multi-use of the particular gaged sites. The sites funded by IDNR may change over time depending on the new network optimization design in FY09 and beyond based upon the analysis from the "Surface-Water Estimation" project. IDNR ambient monitoring sites will be given the highest priority for continued funding with the NSIP funding.

Surface-Water Flow Estimation project proposal is being developed for a one-year development effort for the methodology of estimating flow at ungaged locations. The scope of the project is statewide as the estimation of surface-water flow if for any stream point in Iowa. The method for estimation will have to account for physiographic, land-use, climatological, and watershed differences across Iowa. Estimation of flow will be for the mean daily streamflow for any day prior to the present; values that will likely be presented to the public will be in the form of a range of one standard deviation from the estimated value. The actual mean daily estimated values and other frequency estimates of surface-water flow will be used internally with the IDNR for water resource analysis and management. An IDNR staff member will be working collaboratively on the project with USGS staff.

Watershed Assessment (SPARROW) is a planned extension of the pilot project being funded in FY07. SPARROW model will be used to evaluate and explain the spatial variability in the long-term mean-annual or mean-seasonal (mass per unit of time) of contaminants in streams for various target years. The SPARROW model has been used to for national and regional assessment of water quality of stream in relationship to land use and watershed characteristics. SPARROW relates in-stream water-quality measurements to spatially referenced characteristics of watersheds, including contaminant sources and factors influencing terrestrial and stream transport. The model empirically estimates the origin and fate of contaminants in streams, and quantifies uncertainties in these estimates based on model coefficient error and unexplained variability in the observed data. Iowa is the focal point for land use change to predominately corn production in response to the projected increase in ethanol manufacturing. Resource managers in Iowa need a simulation tool for understanding the potential impacts of the rapid land use change on the water quality of streams.

Appendix B: IDNR and USGS Program Proposal for 2008
(October 2007 through September 2007**)**

Cooperative Program	**IDNR-WMS**	**USGS**	**Total**
Ground-water Levels and Assessment	$55,000	$45,000	$100,000
Surface-water Quality Assessment	$135,000	$110,000	$245,000
Surface-water Flow Network	$195,000	$160,000	$355,000
Surface-water Flow Est.	$60,000	$49,000	$109,000
Watershed Assessment (SPARROW)	$55,000	$45,000	$100,000
Total	$500,000	$409,000	$909,000

Funding for this contract comes from Funds Appropriated for the State Water Plan.

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September 10, 2007

Summary of
Joint Funding Agreement
Between
Iowa Department of Natural Resources
And
United States Geological Survey (USGS)
For federal fiscal year 2008
(October 1, 2007, through September 30, 2008)

Five projects are provided for in this Joint Funding Agreement. DNR will contribute $500,00.00 and USGS will contribute $409,000.00 to cover all the costs of necessary field and analytical work directly related to these five projects. DNR will be billed for its contribution on a quarterly basis. The five projects are as follows:

Watershed Assessment (SPARROW) is a planned extension of the pilot project funded in federal fiscal year 2007. The SPARROW model empirically estimates the origin and fate of contaminants in streams, and quantifies uncertainties in these estimates based on model coefficient error and unexplained variability in the observed data. Iowa is the focal point for land use change to predominately corn production in response to the projected increase in ethanol manufacturing. Resource managers in Iowa need a simulation tool for understanding the potential impacts of the rapid land use change on the water quality of streams. The SPARROW model has been used for national and regional assessment of water quality of streams in relationship to land use and watershed characteristics. SPARROW relates in-stream water-quality measurements to spatially referenced characteristics of watersheds, including contaminant sources and factors influencing terrestrial and stream transport. The SPARROW model will be used to evaluate and explain the spatial variability in the long-term mean-annual or mean-seasonal (mass per unit of time) of contaminants in streams for various target years.

Ground-Water Levels and Water-Quality Assessment. The purpose of this project is to establish a network of public wells to provide a method for the measurement of ground-water levels and ground-water quality by major aquifer type. The public well network will be determined from available public wells that meet the network well search criteria established by the DNR/USGS team. The program will result in a written plan to provide an assessment of ground-water levels based upon the past and future data collection.

Surface-Water Quality Assessment. The purpose of this project is to modify the "Big Rivers" project to better coordinate with DNR's ambient water monitoring program. Water monitoring sites will be reviewed and recommendations will be made to provide better alignment with DNR's existing ambient monitoring network. Data assessment and interpretation will be developed to provide ongoing analysis of the information in collaboration with DNR's ambient program. The goal of the program is continued development of the ability to provide the water-quality index for any stream point in Iowa. The program will develop a method for for estimating load fluxes for both actual temporal and spatial loading as well as a monitoring network that would meet the SPARROW modeling.

Surface-Water Flow Network. The purpose of this program is to maintain steam gages in priority locations throughout Iowa. DNR and DNR stakeholders will establish the

priority for funding specific gage locations, and there will be several tiers of priority based upon the multi-use of the particular gaged sites. The sites funded by DNR may change over time depending on the new network optimization design in FY09 and beyond and based upon the analysis from the "Surface-Water Flow Estimation" project. DNR ambient monitoring sites will be given the highest priority for continued funding with the NSIP funding.

Surface-Water Flow Estimation. The purpose of this project is to develop a methodology of estimating surface-water flow at ungaged locations throughout the state. The goal of the project is to be able to estimate surface-water flow at any stream point in Iowa. The method for estimation will account for physiographic, land-use, climatological, and watershed differences across Iowa. Estimation of flow will be for the mean daily stream flow for any day prior to the present. Values from this project presented to the public will be in the form of a range of one standard deviation from the estimated value. The actual mean daily estimated values and other frequency estimates of surface-water flow will be used internally by DNR for water resource analysis and management. A DNR staff member will be working collaboratively on the project with USGS staff.

The following table shows the contributions of DNR and USGS to each project:

Cooperative Program	**Total Cost**	**DNR contribution**	**USGS contribution**
Watershed Assessment (SPARROW)	$ 100,00.00	$ 55,000.00	$ 45,000.00
Ground-water Levels and Water-Quality Assessment.	$ 100,00.00	$ 55,000.00	$ 45,000.00
Surface-water Quality Assessment	$245,000.00	$135,000.00	$110,000.00
Surface-water Flow Network	$355,000.00	$195,000.00	$160,000.00
Surface-Water Flow Estimation	$109,000.00	$ 60,000.00	$ 49,000.00
Total	$909,000.00	$500,000.00	$409,000.00

The following table contains the DNR quarterly payment schedule:

Payment Period	**Amount of Payment**
1st & 2nd quarter billings are for Ground-water Levels and Assessment and Surface-water Flow Estimation	
First Quarter (October 1, 2007, through December 31, 2007)	$ 85,000.00
Second Quarter (January 1, 2008, through March 31, 2008)	$ 85,000.00
3rd & 4th quarter billings are for Surface-water Quality Assessment and Surface-water Flow Network stations	
Third Quarter (April 1, 2008, through June 30, 2008)	$ 165,000.00
Fourth Quarter (July 1, 2007, through September 30, 2007)	$ 165,000.00
Total Agreement Payment	**$ 500,000.00**